REMARKS

Claims 1-9 are pending in this application.

Rejection of claims 1–5 and 7-9 under 35 U.S.C. 103(a)

Claims 1–5 and 7-9 stand rejected under 35 U.S.C. 103(a) as being unpatentable over Peterson et al. (U.S. 5,986,712).

The present claimed invention recites a process and device for the MPEG type video coding of high definition images wherein the image is split into panels and an encoder is assigned to each panel. Two or more panels constitute, over the length of the image, a horizontal band of the image. A rate control is implemented at a band level as a function of a preset bit rate for the band. Each encoder of the band takes into account a same Video Buffering Verifier (VBV) calculated for the whole band. Independent claims 1 and 7 each include similar limitations to those discussed above and thus all arguments presented below apply to these claims.

The present claimed invention provides an implementation of the rate control algorithm of each coder at a band level by using a unique virtual buffer. This unique virtual buffer is a global VBV buffer which takes into account global data, i.e. data concerning the whole band. The band is made up of panels whose coding is made at a band level as opposed to a panel level. To implement this global Video Buffer Verifier (VBV), encoders sharing a band need to exchange the encoding cost of their piece of MacroBlocks slice (or row) after each MacroBlocks slice (row). Then, thanks to this "global" information, the global rate control can adjust quantization for the next MacroBlocks slice (or row) if necessary. Therefore, encoders sharing a band have the same quantization on each MB slice (or row).

Instead of constraints specific to each coder, one single constraint exists for the whole band of the present claimed invention. The constraint applies to each encoder and relates to the single Video Buffer Verifier. The global constraint for the band is

consecutively reduced, as it is no longer an addition of constraints of each coder dedicated to the band (overflow can be compensated by underflow), allowing improvement of the coding image quality.

Peterson et al. describe an apparatus which receives a picture broken up into a plurality of partitions such as horizontal bands or stripes (Col. 2, lines 10-18) and the picture is encoded by determining a total target number of encoded bits to avoid overflow or underflow of the local VBV maintained by an encoder. Each encoder determines a local target number of encoded bits for each partition of the picture in accordance with the total target number. A plurality of partition encoders encode each partition in accordance with the local target number. Each partition encoder maintains a local VBV having a local VBV fullness, to monitor local underflow or overflow conditions.

The Office Action contends suggests that Peterson et al. disclose high definition images with two or more panels enclosed within each horizontal and vertical band, wherein a single encoder is assigned to each panel. However, Peterson et al. disclose "a plurality of stripe rate encoders 210_i. The input picture consists of seven horizontal stripes S_i, each of which is encoded in parallel by corresponding stripe controller 210_i" (Col. 4, lines 57-59). Peterson et al. merely use a **single** encoder to encode each horizontal or vertical band. This is unlike the present claimed invention in which the horizontal bands of the image contain **two or more** panels wherein each panel has an assigned encoder. Accordingly, each horizontal band of the present claimed invention is encoded by **at least two** encoders. Therefore, Peterson et al. neither disclose nor suggest a "an encoder being assigned to each panel, two or more panels constituting, over the length of the image, a horizontal band of the image" as claimed in claims 1 and 7 of the present claimed invention. This aspect of the invention is essential for the inventiveness of using a single VBV to calculate the whole band to apply for the inventive aspect of the present invention uses a single VBV for multiple encoders in the same band.

The Office Action further contends that Peterson et al. disclose that each encoder in a band takes into account the same VBV calculated for the whole band. However, Peterson et al. describe that "each stripe encoder maintains a local effective buffer fullness" (Col. 3, lines 22-23). Peterson et al. further state that "each stripe encoder 210_i has its own variables...which are distinct...[and] is the portion of the target number of bits for the entire picture allocated to the stripe" (Col. 6, lines 60-67). Therefore, even if Peterson et al. would disclose multiple buffers within each horizontal stripe the buffers would utilize a **local** VBV with local settings and not a **global** VBV with global settings for the entire horizontal band as in the present claimed invention. Therefore Peterson et al. neither disclose nor suggest that when two or more encoders are assigned to each horizontal band "each encoder of the band tak[es] into account a **same** Video Buffering Verifier (VBV) **calculated for the whole band**" as claimed in claims 1 and 7 of the present invention.

Peterson et al. refer to the global image, not to a stripe, using several encoders, each encoder having its own specific local VBV and specific control rate management. Once the target bits are distributed to the stripes, the rate control and coding of each stripe is made independently of one another. Therefore, even though bit allocations and local target numbers of encoded bits are decided for each stripe, and more importantly for each encoder, one allocation can not compensate for another during the coding process for additional constraints exist due to separate management/rate control. This is illustrated in Figure 3. of Peterson et al. This figure illustrates the method of operation of the hybrid global/local stripe rate control system wherein the target number of bits T is computed for the entire image and then allocated to the individual stripe encoders according to the expected complexity of the stripes.

However, the present claimed invention uses a unique VBV for rate control of a whole band (stripe), corresponding to two or more encoders. For example, the present claimed invention calculates the quantization step for a slice (row) of macroblocks according to the fullness of a unique VBV, which is calculated for the whole band. This is possible because encoding data is exchanged between individual encoders.

Therefore, although each encoder calculates a quantization step, its value is the same for its slice of the macroblocks for the rate control is at a band level.

This rate control, encompassing the current coding cost of several encoders, is more efficient for there is no target bit for each encoder but a single target bit for the whole band.

As claims 2-5 and 8-9 are dependant on independent claims 1 and 7, respectively, it is respectfully submitted that they are allowable for the same reasons as discussed above. In view of the above remarks, it is respectfully submitted that claims 1-5 and 7-9 are patentable over of Peterson et al. It is thus further respectfully submitted that this rejection is satisfied and should be withdrawn.

Claim 6 has been indicated as allowable. In view of the above remarks, it is respectfully submitted that all claims (claims1-9) pending in this application are in condition for allowance. Accordingly then, reconsideration and allowance are respectfully solicited. If, however, the Examiner is of the opinion that such action cannot be taken, the Examiner is invited to contact the applicant's attorney at the phone number below, so that a mutually convenient date and time for a telephonic interview may be scheduled.

No additional fee is believed due with this response. However, if an additional fee is due, please charge the additional fee to Deposit Account 07-0832.

Respectfully submitted,
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